## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Queen et al (US 5,567,256) in view of (Stahlecker et al (US 4,484,433) or Nomura et al (US 5,611,819) and GB 2,205,116 A.

With respect to claims 1 and 15, Queen et al discloses a process of making blended yarns for carpet rugs, the process comprises spinning 70-90% of cotton fibers and 30-10% of heat-activated polyester binder fibers to form blended yarns, ply twisting the blended yarns; and then heat-setting the ply twisted yarns at a temperature of about 275 °F (i.e. 135 °C) to melt the binder fibers *"so that the cotton fibers are impregnated, reinforced and strengthened"* by the fibers (abstract; col. 1 line 48 to col. 3 line 4; claim 1; figure 1). Although not explicitly disclosed, it is understood that, a bundle or a sliver of cotton fibers is fed into a spinning station. In any event, such would have been obvious in the art as such is conventional in the art of forming yarn by spinning. Reading the Queen et al patent as a whole, one in the art would have reasonably understood that, the cotton fibers and heat-activated binder fibers are separately fed into a spinning

device as evidence from figure 1 and a passage in column 1 lines 50-52. In any event, such would have been obvious in the art since it is old in the art to form *"a blended yarn"* or *"mixed yarn"* by separately feeding different types of fibers into a spinning machine as exemplified in the teachings of Nomura et al (col. 7 line 63 to col. 8 line 12) or Stahlecker et al (abstract; col. 1 lines 6-12; col. 2 lines 3-19; col. 3 lines 40-43; col. 4 lines 29-58; figure 2).

Queen et al differs from claims 1 and 15, in that, Queen does not expressly disclose the type of spinning technique which is used in making a blended yarn. In particular, Queen et al does not expressly disclosed using either a ring-spinning or wrap spinning method in forming a blended yarn. However, it would have been obvious in the art to use either a ring-spinning or wrap spinning technique in making a blended yarn taught by Queen et al, because: a) it is conventional in the art to make yarns by either ring spinning method or wrap spinning method; b) it is well known in the art of making yarn to form a blended or mixed yarn by wrap or ring spinning method as disclosed for example by Stahlecker et al (col. 2 lines 3-11; col. 3 lines 40-43; figure 2) or Nomura et al (col. 7 line 63 to col. 8 line 12); and c) it is well known in the art to **wrap-spin** and heat-activate a blend of binder-fibers containing heat-activated adhesive and base fibers to stabilize a blended carpet yarn thereby *"improving the tuft definition and appearance retention"* as exemplified in the teachings of GB '116 (abstract; page 6 full paragraph 1; claim 1).

With respect to claim 3, it is conventional in the art to form bundles of staple cotton fibers by spinning them together.

3. Claims 1-3 are rejected undr 35 U.S.C. 103(a) as being unpatentable over Lofquist (US 5,478,624) in view of (Stahlecker et al (US 4,484,433) or Nomura et al (US 5,611,819)), Scott (US 4,668,552) and Queen et al (US 5,567,256).

With respect to claims 1 and 15, Lofquist discloses a process of making synthetic yarn having a heat-activated binder fiber, the process comprises:

a) providing a bulk continuous filament base fiber, the base fiber can be any one of *"nylon 6, nylon 66, and polyester"*;

b) blending the bulk base fiber with heat-activated binder fibers *"via conventional means such as commingling"* (emphasis added) to form a blended yarn, the heat-activated binder fibers have a melting range of 165-190°C;

c) twist-setting at least two blended yarns to form a plied yarn using a Suessen or Superba processes and the plied yarn comprises about 1-12% weight of binder fibers;

d) heating the plied yarn to melt the binder fibers; and then

e) cooling the heated yarn to harden the binder fibers (col. 1 line 62 to col. 2 line 22; col. 3 line 12 to col. 4 line 29; col. 7 line 35 to col. 8 line 17).

Lofquist does not expressly teach using either a ring spinning or wrap spinning technique in forming the blended yarn. However, absent any showing of unexpected benefit/result, it would have been obvious in the art making the synthetic yarn of Lofquist to wrap spin the base fibers and the binder fibers together to form a blended yarn because: a) it is conventional in the art to make yarns by either ring spinning

method or wrap spinning method; b) it is old in the art of making yarn to form a blended or mixed yarn using a wrap or ring spinning method as disclosed for example by Stahlecker et al (col. 1 lines 9-40; abstract) or Nomura et al (col. 7 line 63 to col. 8 line 12); c) it is also old in the carpet making art to uniformly spirally wrapped a binder strand around a base strand to form a blended tufting yarn as taught for example by Scott (col. 6 lines 52-68; figures 3-5 and 8); d) Queen et al discloses making blended yarns for carpet rugs by spinning cotton fibers and heat-activated binder fibers to form blended yarns, ply twisting the blended yarns and then heat-setting the ply twisted yarns to melt the binder fibers *"so that the cotton fibers are impregnated, reinforced and strengthened"* by the fibers (abstract; col. 1 line 48 to col. 3 line 4; claim 1; figure 1); and, e) it is well within the purview of choice in the art to choose on whether to form yarns using an illustrative method suggested by Lofquist or other conventional yarn making methods such as a wrap spinning technique, only the expected result of effectively forming a blended yarn having base fibers and binder fibers would have been achieved in using any one of the well known methods.

With respect to claims 2-3, since Lofquist teaches using a yarn from a base fiber prior to commingling it with binder fibers (col. 3 lines 37-41); since it is conventional in the art to form yarns by spinning staple fibers/filaments; and since Lofquist also teaches heating a plied yarn during a twist-setting operation (col. 4 lines 7-29); these claims would have been obvious in the art making the synthetic yarn of Lofquist.

With respect to claim 14, as noted above, Lofquist teaches using Nylon 6 base fibers. In view that the recited base material is similar to, if not identical, to the base

material taught by Lofquist, the base material of Lofquist must fall within the range recited in this claim.

4. Claims 1-3 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stahlecker et al (US 4,495,758) in view of Lofquist (US 5,478,624), Queen et al (US 5,567,256), GB 2,205,116 A, and Scott (US 4,668,552).

Stahlecker et al discloses a process of making wrapped yarns, the process comprises wrap spinning a binder strand and a yarn sliver together to spirally wrap the binder strand around the yarn sliver (col. 1 lines 9-40; abstract).

It is unclear whether the binder strand taught by Stahlecker et al and the binder strand of related arts disclosed in the background of the invention are heat-activated adhesive. In any event, such would have been obvious in the art making carpet yarns using the process taught by Stahlecker et al because: a) GB '116 discloses spinning such as **wrap-spinning** and heat-activating a blend of binder-fibers containing heat-activated adhesive and base fibers to stabilize a blended carpet yarn thereby *"improving the tuft definition and appearance retention"* (abstract; page 6 full paragraph 1; claim 1); b) Queen et al discloses making blended yarns for carpet rugs by spinning cotton fibers and heat-activated binder fibers to form blended yarns, ply twisting the blended yarns and then heat-setting the ply twisted yarns to melt the binder fibers *"so that the cotton fibers are impregnated, reinforced and strengthened"* by the fibers (abstract; col. 1 line 48 to col. 3 line 4; claim 1; figure 1); and c) it is old in the carpet art to spirally wrap heat-activated binder fibers around base fibers as exemplified in the teachings of Scott (col. 2 lines 60-65; col. 6 lines 52-68; figures 3-4 and 8-9). Note: Scott also discloses the

advantage of enhancing "the integrity of the fabric" in using heat-activated binder fibers in forming a blended wrap yarn (col. 2 lines 60-65).

Stahlecker et al does not teach twisting two or more yarns to form a plied yarn and then heat-setting the plied yarn. However, it would have been obvious in the art, motivated by the desired to apply the yarn making process of Stahlecker et al to form carpet yarns, to twist two or more yarns to form a plied yarn and then to heat-set the plied yarn as such is conventional in the art of making carpet yarns as evidence from the teachings of Lofquist (col. 1 62 to col. 2 line 13) in order to obtain the desired carpet yarn bulk. Note: as noted above, Queen et al also teaches twisting two or more yarns to form a plied yarn and then heat-setting the plied yarn.

The process of Stahlecker and the related art are silent on the composition of the binder relative to the yarn sliver. However, such would have been obvious in the art because Lofquist discloses the desirabililty of blending 1-12 weight per cent of binder strand to a base yarn to form a carpet yarn (col. 2 lines 28-58); because Scott discloses spirally wrapping about 3-10 weight per cent (based on the total weight of the yarn) of binder strand around a base strand (claims 2 and 6); and, because one in the art would have determined a workable composition of a blended yarn for the desired end-use of the article. As for the steps of heating to melt the binder around the yarn and cooling to harden the binder, such would have been obvious in the art as such is conventional in the art as taught by Scott and Lofquist.

With respect to claims 2-3 and 14-15, see column 3 line 13 to column 4 line 42 of the Lofquist patent. These claims would have been obvious in the art for the same reasons as numbered paragraph 2.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-3 and 14-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is indefinite because the materials listed in a Markush group is confusing. In particular, the listed materials "polyamides, nylon-6, nylon-6,6 ..." is confusing. Shouldn't nylon 6 and nylon 6,6 be particular species of polyamides? Does this claim read on using polyamides that are not nylon 6 or nylon 6,6?

***Response to Arguments***

7. Applicant's arguments filed on 08-14-03 have been fully considered but they are not persuasive.

Counsel's argument essentially can be sum up to the following:

The prior art references blend distinct fibers (i.e. low melting binder fibers and base fibers) prior to subjecting them to a spinning operation in forming a yarn, so that, "the low melting" binder fibers in a resultant yarn are "randomly disperse in the base fibers.". "In the present invention, the ring spun or wrap spun yarns

have two distinct yarn components-a first fiber bundle essentially of base fibers and a second fiber which comprises heat activated binder fibers.".